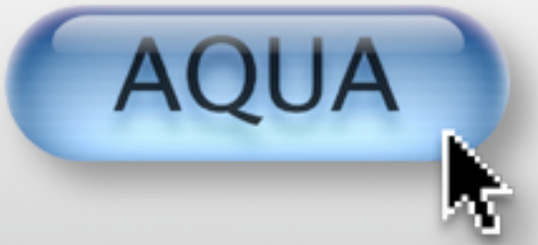
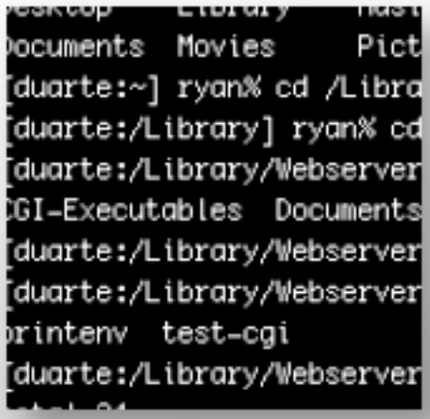
Carbon: The New HIToolbox

Session 409





Carbon: The New HIToolbox

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New HIToolbox?

What's the New HIToolbox?

- HIObject: Object model
- HIView: Composited view model
- Carbon Events: Messaging model
- Standard Event Handlers: Base-class behaviors

Built on a modern foundation

“To Stand Still Is to Regress”

Why Should You Care?

- New features are available through HIObject and HIView
- Best performance
- Easy, iterative adoption path
- Keep using portable C and C++ code

Take your Carbon app to the next level

What You Will Learn Today

- New views
  - HISearchField, HITextView, HISegmentView
  - HIMenuView, HIStandardMenuView
- New features
  - HITheme APIs
  - HIView layout
- Free stuff the New HIToolbox provides

Performance Improvements

- Event building, sending, and handling
- Window and view resize
- HIView manipulation
- Theme text drawing
- Menu item addition and manipulation
- DataBrowser add, remove, and select items

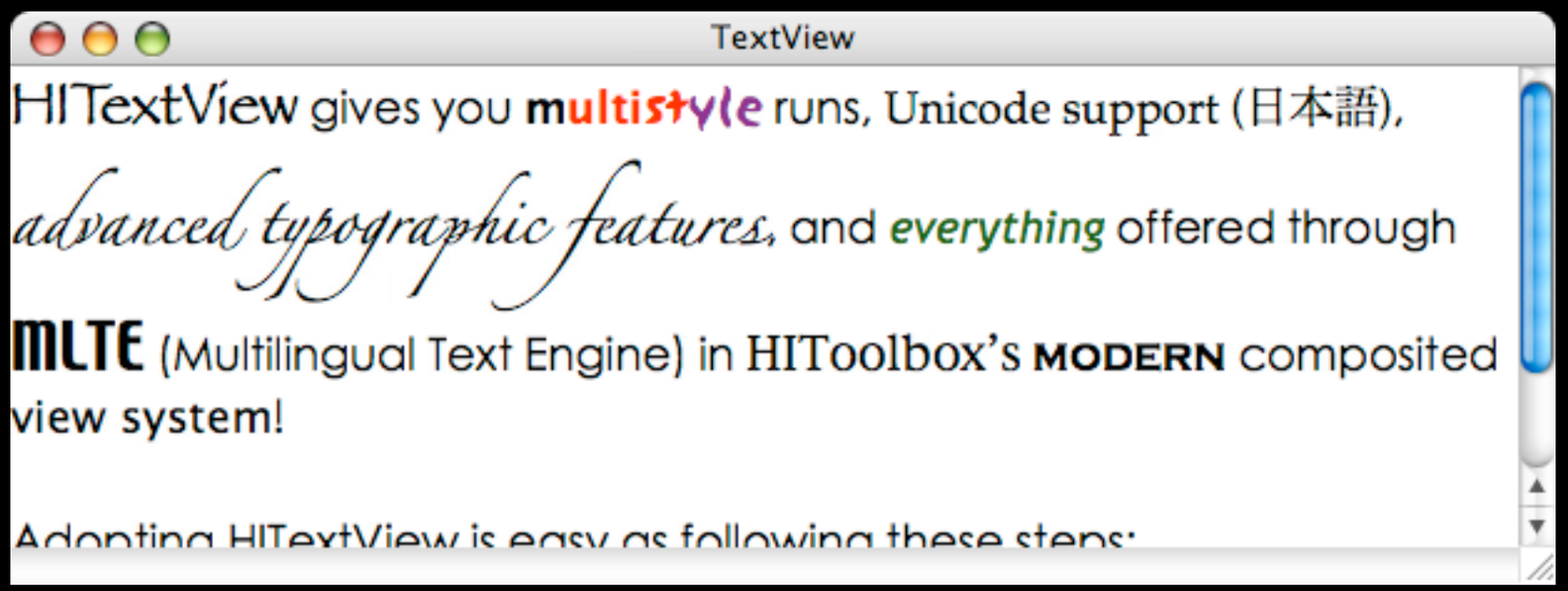
New in the Panther HIToolbox

- HITextView
- HISearchField
- HISegmentView
- HITheme APIs
- HIView Layout
- Custom Menu content via HIView
- Lots more…

HITextView

Why Use HITextView?

- Full-featured text editing HIView
  - Compositing mode only
- Implemented using MLTE
- Integrates with the Edit, Services menus
- Integrates with the Font Panel (soon)



HITextView Wraps Around MLTE

- HITextView API is very small
- Exposes the MLTE object
  - HITextViewGetTXNObject
- MLTE API is partially disabled for these TXNObjects
  - Can’t draw, change bounds, etc., with MLTE API
  - Use appropriate HIView APIs instead

HITextView and HIScrollView

- Designed to work together seamlessly
- Embed the HITextView in an HIScrollView
  - HITextView manages the text
  - HIScrollView manages the scrolling

HITextView Creation

```
HIViewRef myTextView;

HITextViewCreate(   NULL, /* frame */
                    0, /* option bits */
                    0, /* TXNFrameOptions */,
                    &myTextView );

HIViewAddSubview( myScrollView, myTextView );
```

HITextView Manipulation

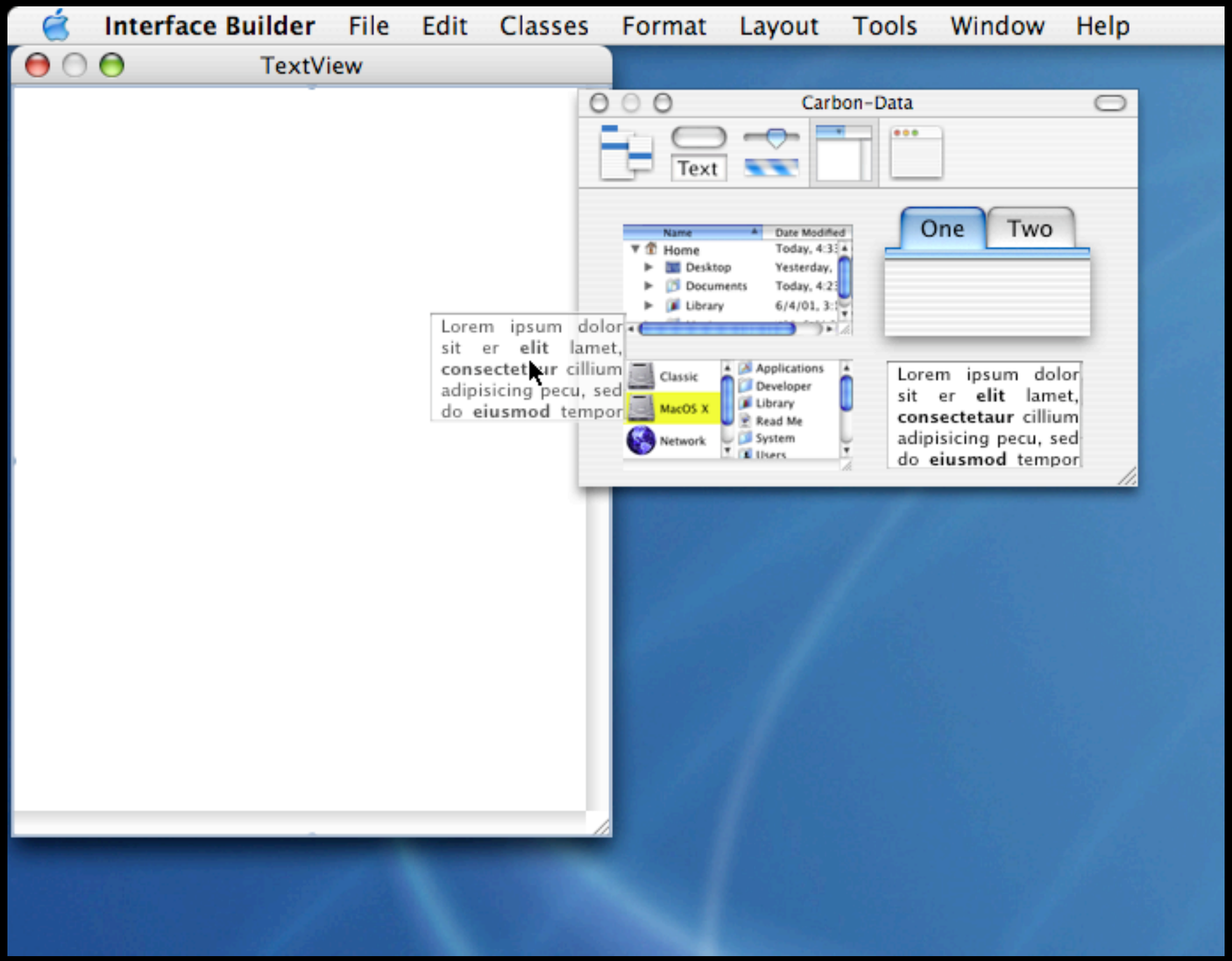
```
TXNObject   txn;
CFURLRef    myURL;

txn = HITextViewGetTXNObject( myTextView );

// ... build a URL to a file ...

TXNSetDataFromCFURLRef( txn, myURL,
    kTXNStartOffset, kTXNEndOffset );
```

Or...


Interface Builder
File
Edit
Classes
Format
Layout
Tools
Window
Help
TextView
Carbon-Data
Text
Name
Date Modified
Home
Desktop
Documents
Library
Classic
MacOS X
Network
Applications
Developer
Library
Read Me
System
One
Two
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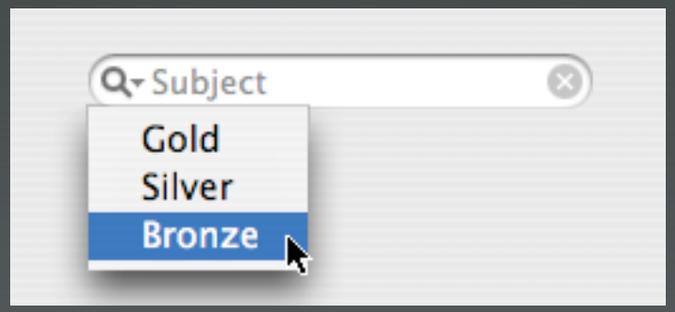
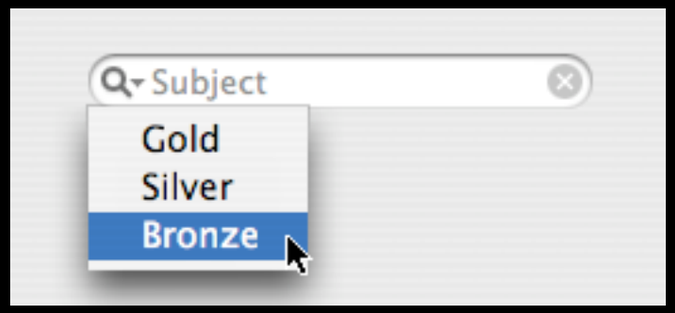
HISearchField



Why Use HISearchField?

- Editable text field with rounded frame
- Optional cancel button
- Optional menu
- Optional descriptive label



HISearchField Creation

```
HIViewRef   mySearchField;
MenuRef     myMenu;

// ... create a MenuRef ...

HISearchFieldCreate(
    &frame, /* frame rect */
    kHISearchFieldAttributesCancel, /* attributes */
    myMenu, /* optional menu */
    CFSTR( “mailbox” ), /* descriptive text */
    &mySearchField );
```

HISearchField Creation

```
EventTypeSpec   events = {
    { kEventClassTextField, kEventTextAccepted },
    { kEventClassSearchField,
        kEventSearchFieldCancelClicked } };

InstallEventHandler(
    GetControlEventTarget( mySearchField ),
    MySearchFieldHandler,
    GetEventTypeCount( events ),
    events,
    mySearchField,  /* ref con */
    NULL );
```

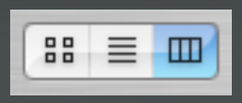
HISearchField Event Handling

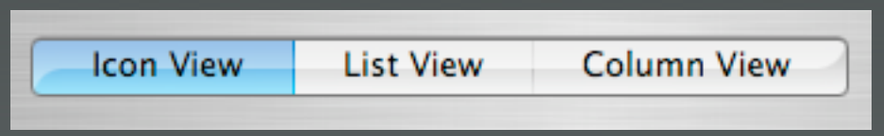
```
if ( class == kEventClassTextField &&
    kind == kEventTextAccepted )
{
    CFStringRef   string;
    GetControlData( searchField, kControlNoPart,
        kControlEditTextCFStringTag,
        sizeof( string ), NULL, &string );

    MyDoSearch( searchField, string );

    CFRelease( string );
}
```

HISearchField Event Handling

```
else if ( class == kEventClassSearchField &&
    kind == kEventSearchFieldCancelClicked )
{
    MyCancelSearch();
}
```

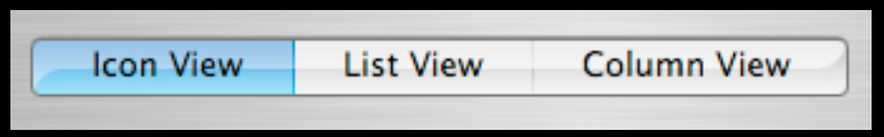
HISegmentView



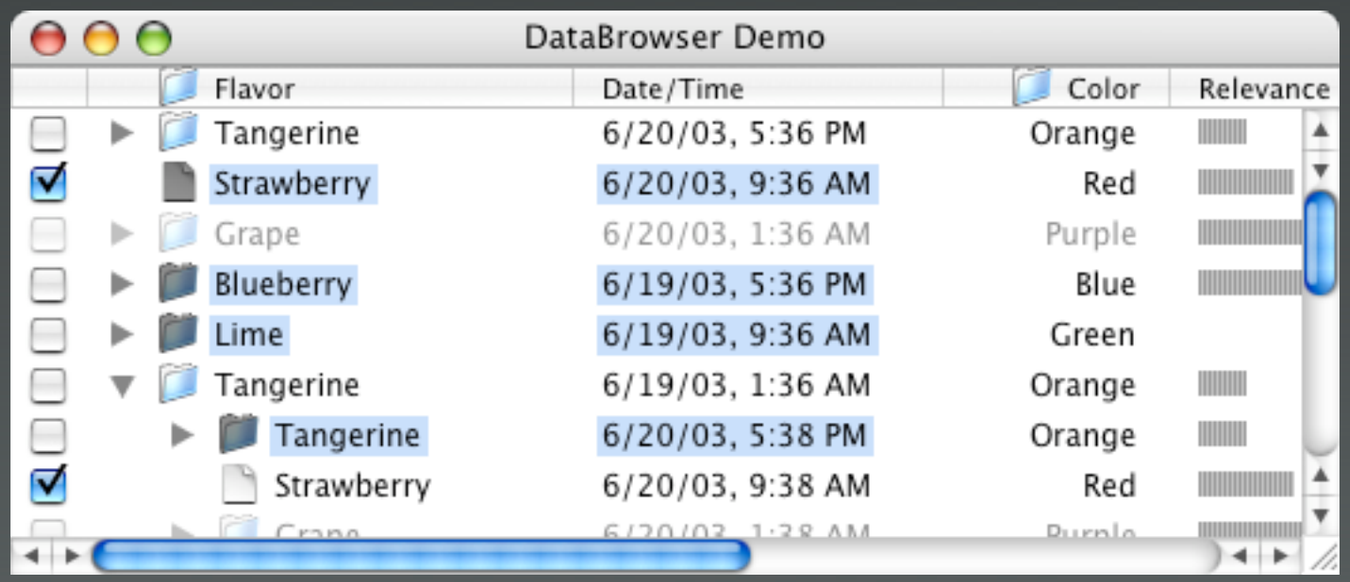


HISegmentView

- Radio, Momentary, and Sticky behaviors
- Customizable content
- Not quite ready for the WWDC build
  - Will be ready for Panther GM



Data Browser Improvements



DataBrowser in Compositing Mode

- It works!
- More efficient in compositing mode
- Work in progress
  - Feedback is appreciated!

List View Type-Selection

- Specify your type-select column with a new property:
  - kDataBrowserListViewTypeSelectColumn
- Type-selection keyboard input via Carbon Events

HITheme

Drawing Primitives

Why Adopt HITheme APIs?

- Much faster than Appearance Manager APIs
- Still familiar usage model
- Draw pulsing push buttons!
- Primitives can draw the newest Aqua widgets
- Only way to print via theme drawing primitives

HITheme vs. Appearance Manager

- Completely Quartz-savvy
- Uses HIPoint and HIRect parameters
- Expect the familiar top-left origin
  - Works with bottom-left origin, too

HIView Layout

Rebounder Demo

Why Use HIView Layouts?

- Layouts manage complex spacial relationships
  - Far more than just springs & rods or bindings
- Toolbox can layout at the most efficient times
- Eliminates or reduces your app's layout code
- Details in Session 425: HIView in Depth

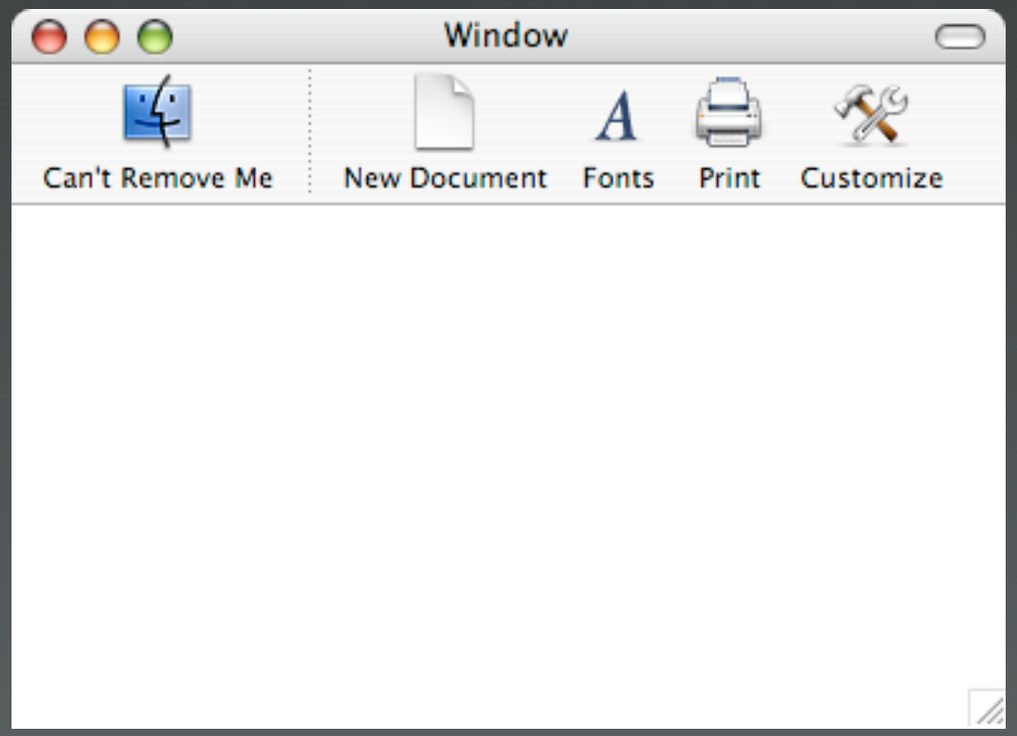
HIAboutBox

SuperUltraMega Pro
2.1
The most super, most ultra, and most mega professional application to date!
Copyright 2003, All Rights Reserved

Why Use HIAboutBox?

- Gives you the HI-conformant about box look
- Near zero effort to adopt
- Fetches info from your App Bundle or “BNDL”
  - You can customize if you wish
- Displays in response to kHICommandAbout
  - You can display it manually, too
- Dismisses in response to kHICommandClose

HIToolbar Additions



HIToolbar Additions

- HIToolbarItemConfigDataChanged
  - Custom items report changed persistent data
- HIToolbarSetItemsWithIdentifiers
  - Most efficient way to manually populate a toolbar

Carbon Event Additions

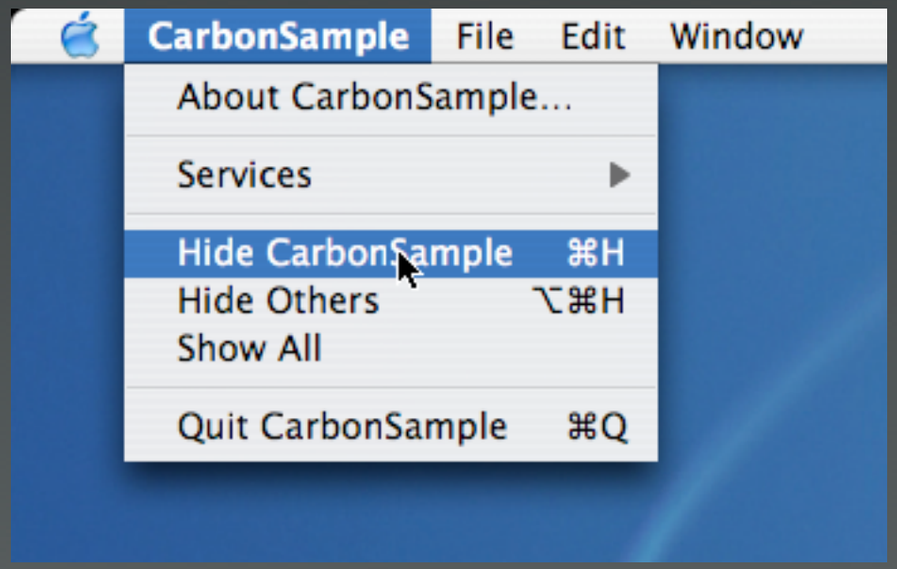
Carbon Event Additions

- HIMouseTrackingGetParameters
- CopyEventAs
- AcquireFirstMatchingEventInQueue
  - Modern replacement for EventAvail and StillDown
  - Does not call the event loop or flush

GetEventMonitorTarget

- Observe other Apps' user input!
  - Key down/up, mouse down/up
- Can't see secure input
- Very performance intensive

Menu Manager Additions



Menu Manager Additions

- CancelMenuTracking
- kEventMenuBarShown/Hidden
  - Sent to the Application target

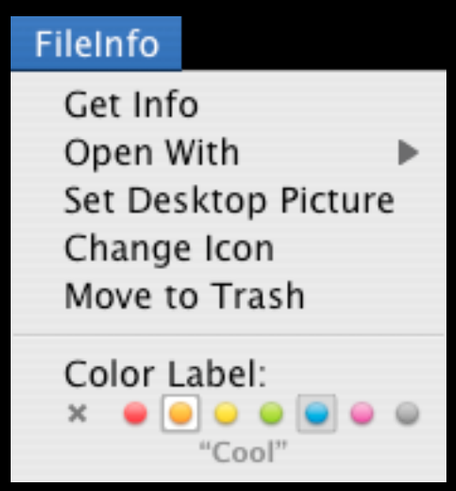
HIView-based Menus

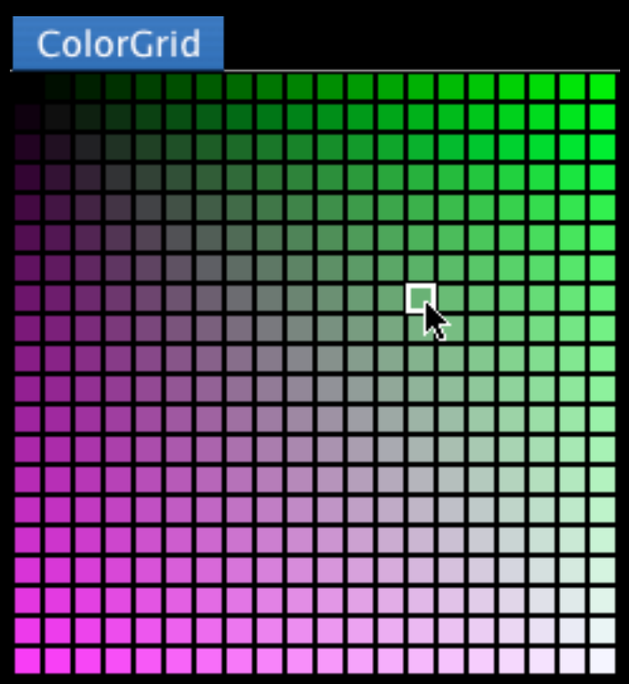
Menu View Basics

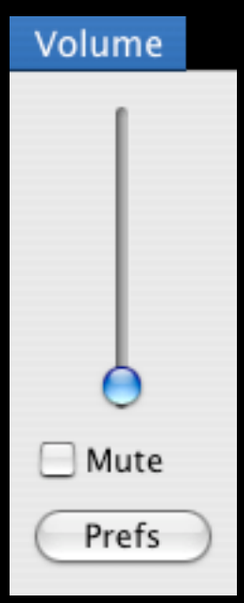
- Menus are drawn in compositing windows
- Menu Content View draws the menu items
  - Standard view draws text, icons, command keys
- Menu Window Frame View draws the background
- HIMenuGetContentView
  - Gets the view that draws the menu items for a menu
- HIMenuViewGetMenu
  - Gets the MenuRef that is drawn by a menu content view

Why Make a Custom Menu?

- Menus that aren't just text and icons
- Grid or X,Y menus: tool or color palette
- "Menus" that aren't really menus: Volume controller







How to Make a Custom Menu

- Use HIObject to inherit from kHIMenuViewClassID
- Embed other HIViews as desired
- Handle some standard HIView Carbon Events
  - View part codes are the menu item indices

Required Carbon Events

- kEventControlDraw
  - Draw your menu items
  - Focused item should be drawn selected
    - HIViewGetFocusPart
- kEventControlHitTest
  - Report the menu item under the point
- kEventControlGetPartRegion
  - Report the region of the given menu item

More Required Carbon Events

- kEventControlGetOptimalBounds
  - Calculate ideal size of the menu content
  - Menu may be sized smaller
  - Scrolling will be handled for you...
- kEventScrollableGetInfo
  - Provide some scrolling details

Other Carbon Events

- Default behavior provided by kHIMenuViewClassID
- kEventMenuCreateFrameView
  - Create a view to draw a custom frame & background
- kEventMenuGetFrameBounds
  - Determine global screen position of the menu
- kEventMenuBecomeScrollable
  - Block/override default menu scrolling functionality
  - Corresponding kEventMenuCeaseToBeScrollable

Other Techniques

- Override standard menu view
  - kHIStandardMenuViewClassID
- Use an HIView to represent an individual menu item
- Put other HIViews in the menu window
- Sample code available

Window Manager Additions

Window Manager Additions

- HIWindowChangeClass
  - Document window <-> Floating window
- HIWindowFlush
- HIWindowIsDocumentModalTarget
  - Detect whether a sheet is being displayed
- DetachSheetWindow
- kEventAppActiveWindowChanged
- kEventAppAvailableWindowBoundsChanged

Window Transitions

- kWindowGenieTransitionEffect
  - Genie whenever and wherever you want!
- TransitionWindowWithOptions
  - Customize transition durations
  - Support for asynchronous transitions
  - Provide user data to the new Carbon Events…
- kEventWindowTransitionStarted
- kEventWindowTransitionCompleted

Asynchronous Window Dragging

- Better responsiveness
  - Improves perceived performance
- Allows user to drag windows of hung/busy apps
- Easy to turn on:
  - kWindowAsyncDragAttribute
- Won’t receive kEventWindowBoundsChanging events

What You Can Do Now

- Use the new Aqua widgets
- Work toward adopting HIView compositing
- Use HITheme APIs instead of the Appearance Manager

Roadmap

415 Data Exchange Options for Carbon Applications	Russian Hill Thu., 10:30am
425 Carbon: HIView in Depth	Presidio Fri., 3:30pm
416 Carbon: Optimizing Performance	Presidio Thu., 2:00pm
307 Using Apple Tools for Carbon Development	Russian Hill Thu., 9:00am

Who to Contact

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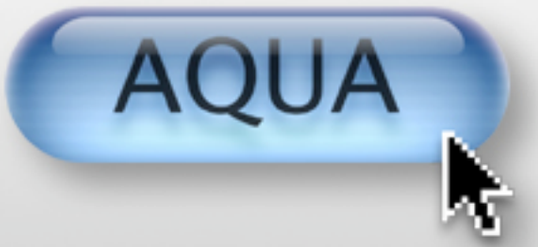
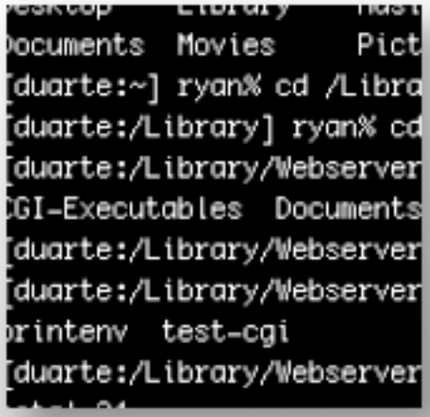
Q&A





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